

CLAIMS

1. (Previously Presented) A method of thermoforming, comprising:
providing a vacuum mold having an internal vacuum chamber;
heating a thermoplastic material;
forming the heated thermoplastic material on the vacuum mold, including drawing a partial vacuum in the internal vacuum chamber; and
cooling the formed thermoplastic material by quenching the thermoplastic material in a quench reservoir containing a quench media while the thermoplastic material remains on the vacuum mold.
2. (Original) The method of claim 1 comprising maintaining the quench at a substantially constant temperature.
3. (Previously Presented) The method of claim 2 including quenching said thermoplastic material in a quench media selected from the group consisting of water, oil, coolant and ceramic beads.
4. (Original) The method of claim 3 comprising removing the thermoplastic material from the vacuum mold by reversing the vacuum and blowing a gas against the thermoplastic material.
5. through 32. (Cancelled)
33. (Previously Presented) A method for forming a sheet of thermoplastic material, comprising:
providing a vacuum mold having a surface and an internal vacuum chamber, said mold defining a plurality of vacuum holes extending between said surface and said vacuum chamber;

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providing a quench containing a quench media comprised of at least one of a liquid and ceramic beads;

heating the thermoplastic material;

vacuum forming said heated thermoplastic material on said surface by applying a partial vacuum to the thermoplastic material through said vacuum holes;

moving one of said quench and said mold to quench said thermoplastic material in said quench media while said thermoplastic material is retained on said surface of said mold.

34. (Withdrawn) The method of claim 33 wherein said moving step includes moving said quench towards said mold so that at least a portion of said mold is positioned within said quench while said thermoplastic material is retained on said mold, whereby at least a portion of the thermoplastic material is in direct contact with said quench media.

35. (Previously Presented) The method of claim 33 wherein said providing said quench includes providing a quench reservoir, said quench reservoir being of sufficient size to receive said mold while a thermoplastic material is retained on said mold.

36. (Previously Presented) The method of claim 33 further comprising maintaining said quench media at a substantially constant temperature.

37. (Previously Presented) The method of claim 33 wherein said moving step includes moving one of said quench and said mold by actuating a plurality of hydraulic cylinders.

38. (Previously Presented) The method of claim 33 comprising holding at least one sheet of the thermoplastic material in a supported position on a rack.

39. (Previously Presented) The method of claim 33 including supporting said mold on a carriage that is translatable between a first position wherein said mold contacts and draws

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said sheet and a second position wherein said carriage disposes said mold with said sheet retained thereon in said quench.

40. (Previously Presented) The method of claim 39 comprising rotating said carriage along an axis so that in said first position said mold faces said sheet and so that in said second position said mold faces said quench.

41. (Previously Presented) The method of claim 39 including translating said mold between said first and second positions by rotating said carriage about 180 degrees.

42. (Previously Presented) A thermoforming method comprising:
providing a cooling tank, said tank containing a quench media comprised of at least one of a liquid and ceramic beads;

providing a mold including at least one of a vacuum cabinet and a vacuum line network in fluid communication with the environment through a plurality of vacuum holes defined by said mold; and

actuating an actuator system between a draw position wherein said mold draws a thermoformable sheet against said mold with a partial vacuum, and a quench position wherein said mold is quenched in said quench media, said cooling tank disengaged from said vacuum mold and the thermoplastic sheet when said actuator system is in said drawing position.

43. (Previously Presented) The thermoforming method of claim 42 including holding at least one thermoformable sheet on a rack.

44. (Previously Presented) The thermoforming method of claim 42 wherein said actuating said actuator system includes driving said mold through said rack to contact said sheet and move said sheet with said mold into said cooling tank and into said quench position.

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45. (Previously Presented) The thermoforming method of claim 44 wherein said actuating said actuator system includes moving said mold into said draw position and then rotating said mold a pre-selected angle so that the mold is moveable into said quench position.

46. (Previously Presented) The thermoforming method of claim 42 including actuating said actuator system by operating a plurality of pneumatic cylinders that move said mold in a first direction to said draw position and then retract said mold away from said draw position in a second direction until said mold is disposed in said quenched position.

47. (Previously Presented) The thermoforming method of claim 42 including holding said thermoformable sheet in a rack and driving said mold into contact with said thermoformable sheet in a first direction and then retracting said mold after the thermoformable sheet is drawn against said mold in a second direction opposite said first direction until the mold attains said quenched position.

48. (Withdrawn) The thermoforming method of claim 42 wherein said actuating said actuator system includes moving said cooling tank toward said mold to quench said mold in said quench media.